

**To:** U.S. Office of Naval Research

**From:** Robert A. Izydore *Robert A. Izydore*  
Department of Chemistry  
North Carolina Central University  
Durham, NC 27707

**Date:** 26 November 96

**Re:** Final Technical Report

**Grant No:** N00014-95-1-1243

**R&T Project:** 1211c01---01

**Grant Title:** Request for Nuclear Magnetic Resonance and X-Ray Crystallographic Instrumentation  
for North Carolina Central University

**Principal Investigator:** Robert A. Izydore

**Grant Period:** 01 SEP 95 through 31 AUG 96

**Total Amount of Grant:** \$243,058.00

DTIC QUALITY INSPECTED 4

**DISTRIBUTION STATEMENT A**

Approved for public release;  
Distribution Unlimited

19961210 074

## Project Description

The purpose of the grant was to purchase a 300 MHz multinuclear nuclear magnetic resonance (NMR) spectrometer. The cost of the instrument was projected to be the funded amount of \$243,058. Additionally it was projected \$48, 950. was needed to renovate room 123 of the Hubbard Chemistry Building at North Carolina Central University (NCCU) to accommodate the instrument. The specific renovations needed were itemized in the proposal. The costs of the renovation was to be paid by NCCU as matching funds.

The instrument is to be used by the principal investigator (PI) to characterize new drugs having antiinflammatory properties that he is synthesizing. These drugs include 3,5-isoxazolidinediones, 3,5-pyrazolidinediones, 1,3,5-triazabicyclo[3.1.0]hexane-2,4-diones, 1,3,5-triazine-4,6(1H,5H)-diones and 1,2,4-triazolidine-3,5-diones. The instrument will be used by Dr. Shawn Sendlinger to characterize new inorganic oligomers and polymers having improved nonlinear properties. Other members of the Chemistry faculty will use the instrument to characterize their research compounds. The instrument will also be available to B.S. and M.S. students in the Department for their research projects, and it will be used in several of our teaching courses. Magnetic nuclei to be detected by the instrument include  $^1\text{H}$ ,  $^{13}\text{C}$ ,  $^{15}\text{N}$ ,  $^{31}\text{P}$ ,  $^{51}\text{V}$ ,  $^{95}\text{Mo}$ , and other transition metals.

## Discussion and Results

The PI investigated the NMR instruments that are commercially available during the fall, 1995. He had several phone discussions and a personal visit with the Varian Associates Sales Representative serving the southeastern United States. On 23-24 January 1996 the PI visited the Varian Associates Applications Laboratory in Florham Park, New Jersey for a comprehensive demo of their NMR instrumentation. Over the next month he worked with Varian Associates to negotiate an acceptable quotation for the specific NMR instrument system that was wanted. When this was accomplished, a requisition was submitted to the NCCU Contracts and Grants and Purchasing Departments on 27 February 1996. After approximately one month the requisition was approved at NCCU. It was then forwarded to the State of North Carolina Division of Purchase and Contract to initiate a competitive bidding process. The bidding process was initiated on 23 April 1996. The official bid opening day was extended from 7 May 1996 to 16 May 1996 and then to 23 May 1996 because of errors that were made in the original bid document published by the state. The bids were forwarded to the PI on 29 May 1996 for his recommendation. The PI recommended on 20 June 1996 that the Varian Associates NMR instrument system be purchased based on its specifications and price. A purchase order for the majority of the instrument system was sent to Varian on 27 June 1996 in the amount of \$230,000. A purchase order for accessories in the amount of \$6,250 was sent to Varian on 18 July 1996, and a final purchase order for accessories in the amount of \$6,603. was sent to Varian on 29 July 1996. The instrument purchased was a Varian Unity Inova 300 NB NMR System. The total cost of the NMR instrument system including shipping was \$242,853.

On 10 May 1995 the PI met with NCCU Chancellor Julius Chambers to discuss the renovations that were needed to room 123 of the Hubbard Chemistry Building. The Chancellor then began a process to procure the needed funds for the project. The PI and Chancellor met several times over the next nine months to discuss the matter. On 7 March 1996 Varian Associates inspected room 123 and

performed a vibration test on the floor which was satisfactory. He also made recommendations for

the renovation. These were submitted to the architect. The architect submitted drawings and specifications for the renovations totaling \$80,000, which was considerably more expensive than the original estimate. Chancellor Chambers approved the renovations, and his approval was sent to the University of North Carolina System for their approval. The University of North Carolina approved the allocation in approximately April. The architect's plans for the renovation of room 123 of the Hubbard Chemistry Building were reviewed by the PI on 14 June 1996. The drawings and specifications were sent to the North Carolina Office of State Construction to initiate a competitive bidding process for the renovation. The contract for the renovations was awarded in July. The renovation work on room 123 was done from August to mid-September. The final electrical connections cannot be made until a larger project to renovate the entire electrical system in the Hubbard Chemistry Building are completed. This is scheduled to begin in December.

The NMR instrument system was delivered to room 123 of the Hubbard Chemistry Building on 18 September 1996. The instrument has not yet been installed by Varian. It awaits the completion of the renovation of the electrical system in the Hubbard Chemistry Building. It is expected that use of the NMR instrument system will begin in early, 1997.

The NCCU Accounts Payable Department paid Varian approximately \$137,000 on about 20 November 1996. The remaining money will be paid as soon as it is determined whether or not Varian actually shipped the computer for the instrument. Varian has advised us not to uncrate the instrument until their installation engineer is present for the installation. They are currently checking their shipping records. The NCCU office of Contracts and Grants will make the final financial report.

Beginning in December, 1995 monthly progress reports were submitted by the PI to Ms. Kathy L. Raible, Administrative Contracting Officer, Office of Naval Research, Regional Office Atlanta. Reports were submitted 20 December, 25 January, 28 February, 28 March, 29 April, 29 May, and 28 June.

## REPORT DOCUMENTATION PAGE

Form Approved  
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave Blank)			2. REPORT DATE 26 Nov 96	3. REPORT TYPE AND DATES COVERED 1 Sep 95-31 Aug 96
4. TITLE AND SUBTITLE Request for Nuclear Magnetic Resonance and X-Ray Crystallographic Instrumentation for North Carolina Central University			5. FUNDING NUMBERS G N00014-95-1-1243	
6. AUTHOR(S) Robert A. Izzydore				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) North Carolina Central University PO Box 19617 Office of Grants and Contracts Department of Chemistry Durham, NC 27707			8. PERFORMING ORGANIZATION REPORT NUMBER RAIONR96TR	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Office of Naval Research Ballston Tower One 800 North Quincy Street Arlington, VA 22217-5660			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES none				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Report is available to the public.			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) Funds in the amount of \$243,058 were received to purchase a 300 MHz multinuclear nuclear magnetic resonance (NMR) spectrometer. The instrument is to be used to characterize new drugs having antiinflammatory properties and new inorganic oligomers and polymers having nonlinear properties. Other members of the faculty as well as students will utilize the instrument for their research projects and course work. The NMR instrument system needed and required specifications were sent out for competitive bids by the North Carolina Division of Purchase and Contract. The bid was awarded to Varian Associates for a Varian Unity Inova 300 NB NMR system. The total cost was \$242,853. Room 123 of the NCCU Hubbard Chemistry Building was renovated to accommodate the instrument. The total cost of \$80,000 was paid by the University as matching funds.				
14. SUBJECT TERMS multinuclear nuclear magnetic resonance spectrometer.			15. NUMBER OF PAGES 3	16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT	

NEN 7540-01-280-5500

REF 9

Standard Form 298 (Rev. 2-89)  
Prescribed by AFCEC GPO GPO-102